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(54) Title: PLANT PROTECTION COMPOSITIONS AND USE THEREOF

(57) Abstract: Disclosed is the use of a plant protection composition, comprising a) 2-ethylexyl lactate, b) one or more agrochemical active substances dissolved therein, and c) optionally one or more formulation aids, for the control of harmful organisms in paddy rice crops; and plant prediction compositions comprising 2-ethylhexyl lactate and specific agrochemical active substance.



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## Plant protection compositions and use thereof

### Description

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The invention relates to uses of plant protection compositions comprising 2-ethylhexyl lactate (EHL), and specific plant protection compositions comprising EHL.

10 In paddy rice crops, for satisfactory control, the rice plants and/or harmful organisms present in the water either have to come into contact in a direct and timely fashion with the active substance to be applied or the active substance has to be evenly and extensively distributed over the entire rice paddy field. E.g. the application of known spray solutions or granules as standard application processes is costly. Processes in which the active substances, in water-soluble containers, such as bottles, disclosed  
15 in JP-A-10175804, or bags, disclosed in US-5 439 683, are positioned on the edge of the rice field are more economical. After the release from the containers, the even distribution of the active substances over the surface of the water is dependent on several factors and can be improved or indeed even guaranteed by suitable additives. Special compositions can be used for sparingly water-soluble active  
20 substances, as disclosed in JP-A-10017410, or the water-insoluble active substance is, as disclosed in JP-A-05339103, dissolved directly in aprotic solvents, such as (C<sub>8</sub>-C<sub>13</sub>)-alkyl phthalates. In WO-A-01/35738, vegetable oil is added to the active substances, and the active substance content in the oil could be further increased by further addition of an aprotic solvent. The active substance is then evenly distributed  
25 in the rice paddy field via the formation of an oil film. However, the oil film may also prevent the exchange of oxygen between air and water and the additional introduction of certain solubility promoters may in consequence lead to negative effects ecologically. In addition, there also furthermore exists a need for new processes which, in paddy rice crops, are easier to operate, more reliable in the  
30 effect and safer to operate for the user.

It was an object of the invention to develop an application process which can be used in the control of harmful organisms in paddy rice crops while to the greatest possible extent avoiding the abovementioned problems of an economic and ecological nature.

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It has now been found, surprisingly, that, through the solution of agrochemical active substances in EHL, a plant protection composition is obtained which is particularly suitable, for the control of harmful organisms in paddy rice crops.

10

The plant protection composition used according to the invention and its application according to the invention are simple and safe to operate for the user, exhibit favorable properties with regard to toxicity and are reliable in the effect for the control of harmful organisms in rice paddy fields. In addition, the behavior with regard to the environment is also improved since EHL, as solvent, can be completely decomposed

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biologically to CO<sub>2</sub> and water. The solvent film formed at the beginning distributes the active substance evenly in the rice paddy field but subsequently disintegrates into thousands of small droplets, with the result that there is no longer the danger of oxygen exchange between air and water being prevented by the surface of the water being completely covered.

20

WO-A-91/14366 discloses EHL as an active substance which regulates the growth of grapes. EHL is here charged directly to water in a fixed dosage without additional additives and is used as leaf spray solution in an early growth stage of the grapes. The use of EHL as solvent is neither revealed nor suggested in this document.

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In WO-A-00/18227, EHL is disclosed as suspending agent for insoluble agrochemical active substances in nonaqueous suspension concentrates.

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In WO-03/075657 EHL is disclosed as an agent for preventing crystallization of pesticidal compositions, particularly compositions comprising azole fungicides, during application.

None of these documents suggests the particular advantages of using EHL containing plant protection compositions for application in paddy rice crops.

- 5 Therefore, in one aspect of the invention there is provided the use of a plant protection composition, comprising
- a) 2-ethylhexal lactate,
  - b) one or more agrochemical active substances dissolved therein, and
  - c) optionally one or more formulation aids,
- 10 for the control of harmful organisms in paddy rice crops.

In a further aspect of the invention there is provided a process for controlling harmful organisms in paddy rice crops, where a plant protection composition, comprising

- a) 2-ethyl lactate,
  - 15 b) one or more agrochemical active substances dissolved therein, and
  - c) optionally one or more formulation aids,
- is applied in or on the water of paddy rice fields.

"Plant protection composition" within the meaning of the invention is the formulation

20 of agrochemical active substances, i.e. either an active substance concentrate, comprising EHL and one or more agrochemical active substance, or such an active substance concentrate and formulation aids. These optionally used formulation aids are additives and aids conventional in formulation technology which are typical of the most varied formulation types, such as emulsifiers (e.g., for the formulation types

25 emulsifiable concentrate (EC) and microemulsion (ME)), wetting agents (e.g., for the formulation type ready-to-use liquid formulation (AL)), inert materials (e.g., for the formulation types granule (GR) and emulsifiable granule (EG)), dispersing agents (e.g., for the formulation types oil-in-water emulsion (EW) and suspoemulsion (SE)) and surfactants (e.g., for the formulation type soluble concentrate (SL)), and also

30 additional solvents, thickeners, flow stabilizers, adjuvants, active substance stabilizers, preservatives, antifoam agents, film-forming agents and antifreeze agents, and which can be used in the most varied formulation types.

The formulation aids which may be necessary, such as emulsifiers, wetting agents, inert materials, dispersing agents, surfactants, solvents and additional additives, are known to a person skilled in the art and are described, for example, in: Watkins,  
5 "Handbook of Insecticide Dust Diluents and Carriers", 2nd Ed., Darland Books, Caldwell, N.J.; H.v. Olphen, "Introduction to Clay Colloid Chemistry", 2nd Ed., J. Wiley & Sons, N.Y.; C. Marsden, "Solvents Guide", 2nd Ed., Interscience, N.Y., 1963; McCutcheon's "Emulsifiers and Detergents – International Ed.", Annual, MC Publ. Corp., Ridgewood, N.Y.; McCutcheon's "Emulsifiers and Detergents – North  
10 America Ed.", Annual, MC Publ. Corp., Ridgewood, N.Y.; Sisley and Wood, "Encyclopedia of Surface Active Agents", Chem. Publ. Co. Inc., N.Y., 1964; Schönfeldt, "Grenzflächenaktive Äthylenoxidaddukte" [Surface-active ethylene oxide adducts], Wiss. Verlagsgesell., Stuttgart, 1976; Winnacker-Küchler, "Chemische Technologie" [Chemical Technology], Volume 7, C. Hanser Verlag, Munich, 4th  
15 edition, 1986; Mollet and Grubenmann, "Formulierungstechnik" [Formulation Technology], Wiley-VCH-Verlag, Weinheim, 2000.

The solvent EHL, 2-ethylhexyl lactate, is an ester of 2-ethylhexanol with lactic acid, preferably L-(+)-lactic acid, such as is obtainable, for example, as Purasolv® EHL  
20 from Purac Bioquímica (Gran Vial 19-25, 08160 Montmelo-Barcelona, Spain) or Purac Biochem (Gorinchem, NL). Additional terms for EHL are: 2-ethylhexyl S-lactate; 2-ethylhexyl L-lactic acid, L-lactic acid 2-ethylhexyl ester; CAS-No. 186817-80-1; EC-No. 228-503-2.

EHL exhibits good solvent properties, it can be completely decomposed biologically to CO<sub>2</sub> and water in the environment and does not have any ozone-reducing action.

In addition, EHL, with LD<sub>50</sub> values (rats, oral) in concentrations of over 2000 mg per kg of body weight, is toxicologically harmless. In the human body, the ester bond in

5 EHL is quickly degraded and EHL is decomposed by enzymatic hydrolysis to CO<sub>2</sub> and water. Because of these convenient properties, EHL is accordingly frequently used in metal working to degrease materials and the printing industry as additive in colorants and inks.

10 These properties are advantageous for the use of EHL in plant protection compositions, as well as for supporting the activity of agrochemical active substances against harmful organisms, whereby also undesired side effects, such as, e.g., plant damage (phytotoxicity) when insecticides are used, can occur to a reduced extent. Additional advantages by the use of EHL are the possibility of  
15 obtaining plant protection compositions with a favourable flash point, whereby restrictions with regard to transportation and storage which may be necessary can be reduced or completely abolished. In addition, the storage stability of plant protection compositions can also be improved by the use of EHL. Furthermore, EHL can keep agrochemical active substances in solution at low temperatures and  
20 consequently ensures the stability toward freezing of plant protection compositions.

Accordingly, the use of EHL may already be advantageous in an active substance concentrate, e.g. by increasing the stability of agrochemical active substances before the preparation of plant protection compositions by wetting the active substance  
25 surface. In addition, EHL may however also contribute to an improved homogeneity of the active substance in the preparation of the plant protection composition.

The term "agrochemical active substances" comprises all substances which are used in the fields of agriculture, horticulture, forestry and veterinary medicine, as well as in  
30 the domestic sphere and in stock-keeping, such as herbicides, insecticides, fungicides, bactericides, nematocides, algicides, molluscicides, virucides, resistance-

inducing substances, substances active as repellants and substances active as growth regulators, compositions with and without biological organisms, and also fertilizers which supply trace elements and nutrients. Herbicidally, insecticidally, fungicidally, bactericidally and virucidally active substances and substances active  
5 as growth regulators are preferred. Herbicidal, insecticidal and fungicidal active substances are particularly preferred.

Preference is given to agrochemical active substances with a solubility in EHL at 20°C of at least 5 g/l, particularly preferably of at least 10 g/l.

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The following may be mentioned as examples of herbicidal active substances: aclonifen, amidosulfuron, anilofos, asulam, benfuresate, byspiribac-sodium, bromoxynil, chlotoluron, cyclanilide, desmedipham, diclofop-methyl, diflufenican, diuron, ethephon, ethofumesate, ethoxysulfuron, fenoxaprop-P-ethyl, fentrazamide,  
15 flucarbazone-sodium, flufenacet, flurtamone, foramsulfuron, glufosinate-ammonium, glyphosate, iodosulfuron, ioxynil, isoproturon, isoxaflutole, linuron, mefenacet, mesosulfuron-methyl, metamitron, metosulam, metribuzin, oxadiargyl, oxadiazon, phenmedipham, propoxycarbazone-sodium, sulcotrione and thidiazuron.

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The following may be mentioned as examples of insecticidal active substances: acetamiprid, acrinathrin, aldicarb, amitraz, azinphos-methyl, beta-cyfluthrin, carbaryl, clothianidin, cyfluthrin, cypermethrin, deltamethrin, endosulfan, ethiprole, ethoprophos, fenamiphos, fenthion, fipronil, imidacloprid, methamidophos, methiocarb, niclosamide, oxydemeton-methyl, permethrin, phosalone, prothiofos,  
25 silafluofen, spiroticlofen, spiromesifen, thiacloprid, thiodicarb, tralomethrin, triazophos, trichlorfon and triflumuron.

The following may be mentioned as examples of fungicidal active substances: bitertanol, bromuconazole, carbendazim, carpropamid, cyproconazole, edifenphos,  
30 fenamidone, fenhexamid, fentin, fluoxastrobin, fluquinconazole, fosetyl-aluminum, iprodione, iprovalicarb, pencycuron, prochloraz, propamocarb HCl, propineb,

prothioconazole, pyrimethanil, spiroxamine, tebuconazole, tolylfluanid-dichlofluanid, triadimefon, triadimenol, trifloxystrobin and triticonazole.

Preferred are herbicidal and insecticidal active substances. More preferred are  
5 insecticidal active substances, in particular ethiprole and fipronil.

The concentrations of the abovementioned active substances in the active  
substance concentrate, i. e. in EHL, vary within a wide range and are dependent on  
the respective end uses. Use is generally made of concentrations which are known  
10 to a person skilled in the art as conventional for active substance concentrates and  
for their respective end uses. Preference is given to concentrations of 0.1% by  
weight to 95% by weight, particularly preferably of 0.2% by weight to 85% by weight.

In a preferred embodiment of the invention compounds from the group consisting of  
15 polydimethylsiloxanes, which are supposed to prevent foam formation (so-called  
“antifoam agents”), such as Break Thru® (Goldschmidt, Essen, GER),  
Dow Corning® (Dow Chemicals, Wiesbaden, GER) and Silwet® (Osi  
Specialities/Akzo Nobel, Frankfurt, GER), are included as additional component of  
the plant protection composition according to the invention. The  
20 polydimethylsiloxanes, inter alia, improve the distribution behavior on the surface of  
the water.

The concentration of polydimethylsiloxanes varies within a wide range and is  
dependent on the desired distribution effect of the plant protection composition.  
25 Generally, use is made of concentrations which are known to a person skilled in the  
art as conventional for the distribution effect desired each time. Preference is given  
to concentrations of 0.5% by weight to 30% by weight, particularly preferably of 3%  
by weight to 10% by weight.

30 Polydimethylsiloxanes are preferably used in liquid formulations, particularly of the  
AL type (as explained below).

In addition to the components already mentioned above, additional substances can be used in formulations according to the invention, according to the chemical nature of the agrochemical active substances.

- 5 These include substances for the stabilization of the agrochemical active substances, such as butylated hydroxytoluene (BHT), citric acid or acetic acid, the selection and concentration of which may vary within a wide range and are dependent on the stability of the agrochemical active substance. Generally, use is made of concentrations which are known to a person skilled in the art as
- 10 conventional for the agrochemical active substance to be dissolved each time. Preference is given to concentrations of 0.01% by weight to 1% by weight, particularly preferably of 0.1% by weight to 0.2% by weight.

- Likewise, additional solvents from the group consisting of nonpolar or polar and
- 15 aprotic or protic solvents, such as benzyl alcohol, dimethylsulfoxide (DMSO), C<sub>12</sub>-C<sub>15</sub> alkyl benzoate (Pentonat DB®), diisopropyl adipate (Crodamol DA®), N-octylpyrrolidone (NOP) or dimethylacetamide (DMAc), can be used in in formulations according to the invention, preferably in liquid formulations, in particular of the AL type (as explained below). The concentration of these additional solvents
- 20 varies within a wide range and is dependent on the solubility characteristics of the agrochemical active substance to be dissolved of the plant protection composition of liquid AL formulation type. Generally, use is made of concentrations which are known to a person skilled in the art as conventional for the agrochemical active substance to be dissolved each time. Preference is given to concentrations of 50%
- 25 by weight to 95% by weight, particularly preferably of 75% by weight to 85% by weight.

- The possible formulation types can be varied broadly. In this connection, the processes used are generally familiar to a person skilled in the art and are
- 30 described, for example, in Winnacker-Küchler, "Chemische Technologie" [Chemical Technology], volume 7, C. Hanser Verlag, Munich, 4th edition, 1986; J.W. van

Valkenburg, "Pesticide Formulations", Marcel Dekker N.Y., 1973; K. Martens, "Spray Drying Handbook", 3rd Ed., 1979, G. Goodwin Ltd., London, or Mollet and Grubenmann, "Formulierungstechnik" [Formulation Technology], Wiley-VCH-Verlag, Weinheim, 2000.

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Examples of formulation types are (use each time of the GCPF formulation code with abbreviation and description): AE Aerosol dispenser; AL Any other liquid; CG Encapsulated granule; CL Contact liquid or gel; CS Capsule suspension; DC Dispersible concentrate; DP Dustable powder; DT Tablet for direct application; EC Emulsifiable concentrate; ED Electrochargeable liquid; EG Emulsifiable Granule; EO Emulsion, water in oil; EW Emulsion, oil in water; FG Fine granule; FS Flowable concentrate for seed treatment; GG Macrogranule; GL Emulsifiable gel; GP Flo-dust; GR Granule; GW Water soluble gel; ME Micro-emulsion; MG Microgranule; OF Oil miscible flowable concentrate/oil miscible suspension; OL Oil miscible liquid; OP Oil dispersible powder; PC Gel or paste concentrate; SE Suspo-emulsion; SG Water soluble granule; SL Soluble concentrate; SO Spreading oil; SP Water soluble powder; ST Water soluble tablet; SU Ultra-low volume (ULV) suspension; TB Tablet; TC Technical material; TK Technical concentrate; UL Ultra-low volume (ULV) liquid; WG Water dispersible granules; WP Wettable powder; XX Others. Preference is given to liquid formulation types and solid formulation types which can be obtained via an active substance concentrate. These include the formulation types EC (GCPF formulation code for emulsifiable concentrate); GR (GCPF formulation code for granule); EW (GCPF formulation code for oil-in-water emulsion); ME (GCPF formulation code for microemulsion); EG (GCPF formulation code for emulsifiable granule); SE (GCPF formulation code for suspoemulsion); SL (GCPF formulation code for soluble concentrate); CS (GCPF formulation code for capsule suspension) and AL (GCPF formulation code for ready-to-use liquid formulation). Special preference is given to liquid formulations in particular to ready-to-use liquid formulations (formulation type AL).

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The concentration of the active substance concentrate, comprising EHL and one or more agrochemically active substances, in the respective formulation type varies

within a wide range and is dependent on the corresponding type of the formulation. Generally, use is made of concentrations which are known to a person skilled in the art as conventional for the respective formulation type. Preference is given to concentrations of 2% by weight to 95% by weight, particularly preferably of 10% by weight to 90% by weight.

The invention also includes the preparation of an active substance concentrate, comprising EHL and one or more agrochemically active substances, and the preparation of plant protection compositions from the active substance concentrate.

The processes used in this connection are generally familiar to a person skilled in the art and are, for example, described in the literature cited with the various formulation types (see above). It is generally advantageous, in the preparation, to use the sequence of the addition and mixing or of the application of the individual constituents represented in the examples.

An active substance concentrate according to the invention is a true solution, i.e. the agrochemical active substances of this liquid concentrate are present in dissolved form at ambient temperature (20°C).

All processes known to a person skilled in the art as conventional can be used as application forms; mention may be made, as examples, of: spraying, fogging, a number of special processes for direct treatment, and a number of special indirect application processes in the vicinity of the plant, such as, for example, granule incorporation in the soil or application in the water of flooded rice paddies.

The respective amounts of the plant protection compositions of various formulation types according to the invention expended per unit area and/or test subject for the control of harmful organisms vary very greatly. Generally, for this, the application media known to a person skilled in the art as conventional for the respective field of use are used in the conventional amounts, such as, for example, from several hundred liters of water per hectare with standard spray processes via a few liters of

oil per hectare with the ultralow volume aircraft application down to a few milliliters of a physiological solution with injection processes. The concentrations of the plant protection compositions according to the invention in the corresponding application media consequently vary within a wide range and are dependent on the respective fields of use. Generally, concentrations are used which are known to a person skilled in the art as conventional for the respective fields of use. Preference is given to concentrations of 0.01% by weight to 99% by weight, particularly preferably of 0.1% by weight to 90% by weight.

In an additional preferred implementation of the invention, it is advantageous to mix the active substance concentrate according to the invention or the plant protection compositions of the varied formulation types prepared therefrom directly with additional plant protection compositions/formulations which in turn can also comprise agrochemical active substances and additional formulation aids. The processes used in this connection, and also the formulation aids which may be necessary and plant protection compositions/formulations, are generally familiar to a person skilled in the art and are described, for example, in the literature cited with the various formulation types (see above), and in: Watkins, "Handbook of Insecticide Dust Diluents and Carriers", 2nd Ed., Darland Books, Caldwell, New Jersey; H.v. Olphen, "Introduction to Clay Colloid Chemistry", 2nd Ed., J. Wiley & Sons, New York; C. Marsden, "Solvents Guide", 2nd Ed., Interscience, New York, 1963; McCutcheon's "Emulsifiers and Detergents – International Ed.", Annual, MC Publ. Corp., Ridgewood, New York; McCutcheon's "Emulsifiers and Detergents – North America Ed.", Annual, MC Publ. Corp., Ridgewood, New York; Sisley and Wood, "Encyclopedia of Surface Active Agents", Chem. Publ. Co. Inc., New York, 1964; Schönfeldt, "Grenzflächenaktive Äthylenoxidaddukte" [Surface-active ethylene oxide adducts], Wiss. Verlagsgesell., Stuttgart, 1976. Preferred processes are tank mix, coformulation and coated granule.

Generally, the abovementioned agrochemical active substances and/or formulation types are preferred as additional mixing partners.

The mixing ratios of the abovementioned mixing partners vary within a wide range and are dependent on the respective end uses. Generally, use is made of mixing ratios which are known to a person skilled in the art as conventional for the respective end uses. These are mixing ratios of

- 5 1-10 000 (plant protection composition/formulation comprising active substance concentrate):1-10 000 (plant protection composition/formulation not comprising active substance concentrate), preferably 1-1000:1-1000, particularly preferably 1-100:1-100.
- 10 A preferred embodiment of the invention is the use of a plant protection composition, which is a liquid formulation, preferably an AL formulation, which comprises EHL, optionally one or more solvents from the group consisting of nonpolar or polar aprotic or protic solvents, one or more antifoam agents from the group consisting of polydimethylsiloxanes, one or more agrochemical active substances and optionally
- 15 substances for the stabilization thereof. Particular preference is given to Purasolv® EHL, DMSO, Break Thru OE 441® and ethiprole, particularly preferably with contents of 65% by weight for Purasolv® EHL, 30% by weight for DMSO, 2% by weight for Break Thru OE 441® and 3% by weight for ethiprole.
- 20 It is generally advantageous, for the preparation of preferred embodiments of the invention, to use the sequence of the addition and mixing of the individual constituents represented in the examples.

- 25 The plant protection compositions used according to the invention are partly known and partly new.

Therefore, in a further aspect of the invention there is provided a plant protection composition, comprising

- a) 2-ethylhexyl lactate,
- 30 b) dissolved therein one or more agrochemical active substances from the group consisting of

- 1) aclonifen, amidosulfuron, anilofos, asulam, benfuresate, byspiribac-sodium, bromoxynil, chlotoluron, cyclanilide, desmedipham, diclofop-methyl, diflufenican, diuron, ethephon, ethofumesate, ethoxysulfuron, fenoxaprop-P-ethyl, fentrazamide, flucarbazone-sodium, flufenacet, flurtamone, foramsulfuron, glufosinate-ammonium, glyphosate, iodosulfuron, ioxynil, isoproturon, isoxaflutole, linuron, mefenacet, mesosulfuron-methyl, metamitron, metosulam, metribuzin, oxadiargyl, oxadiazon, phenmedipham, propoxycarbazone-sodium, sulcotrione and thidiazuron;
- 2) acetamiprid, acrinathrin, aldicarb, amitraz, azinphos-methyl, beta-cyfluthrin, carbaryl, clothianidin, cyfluthrin, cypermethrin, deltamethrin, endosulfan, ethiprole, ethoprophos, fenamiphos, fenthion, fipronil, imidacloprid, methamidophos, methiocarb, niclosamide, oxydemeton-methyl, permethrin, phosalone, prothiofos, silafluofen, spiroticlofen, spiromesifen, thiacloprid, thiodicarb, tralomethrin, triazophos, thrichlorfon and triflumuron;
- 3) and bitertanol, carbendazim, carpropamid, edifenphos, fenamidone, fenhexamid, fentin, fluoxastrobin, fosetyl-aluminum, iprodione, iprovalicarb, pencycuron, propamocarb HCl, propineb, prothioconazole, pyrimethanil, spiroxamine, tolylfluanid-dichlofluanid, and trifloxystrobin;
- c) optionally one or more formulation aids.

Preferred are compositions comprising one or more agrochemical substances from groups 1) and 2), more preferred from group 2), in particular fipronil and/or ethiprole.

Further preferred are compositions comprising as a component c) one or more polydimethyl siloxanes (as described above).

Further preferred are compositions comprising substances for the stabilization of the agrochemical active substances, in particular butylated hydroxytoluene, citric acid or acetic acid.

Further preferred are compositions comprising additional nonpolar, polar aprotic or protic solvents, in particular benzylalcohol, DMSO, C<sub>12-15</sub> alkyl benzoates, diisopropyl adipate, N-octylpyrrolidone, and dimethylacetamide.

- 5 The preferred concentration of these additional formulation aids are given above.

Particularly preferred are compositions comprising two or more of the additional formulation aids.

- 10 Preferred are also liquid formulations of these compositions, particularly of ready to use formulations of the AL formulation type.

In a further aspect of the invention there is provided an active substance concentrate comprising (a) 2-ethylhexyl lactate and (b) one or more agrochemical active

- 15 compounds from groups 1), 2) and/or 3).

In yet a further aspect of the invention, there is provided a water-soluble container comprising a composition as described above.

- 20 The term "harmful organisms" comprises all forms of organisms which cause economic damage and/or damage to the health in the relevant field of use. Preference is given to harmful plant and animal organisms and to organisms which cause diseases; particular preference is given to terrestrial and aquatic weeds, including grass weeds, algae, mosses, arthropods, including insects and arachnids  
25 (such as mites), helminths, including nematodes, rodents, fungi, bacteria and viruses.

Particularly preferred "harmful organisms" means harmful arthropods, including insects and arachnids, and helminths, including nemathodes.

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Examples of harmful organisms in paddy rice crops are (use each time of the taxonomic and English term): *Acanthospermum hispidum* (star burr); *Acidovorax*

- avenae subsp. avenae (bacterial leaf blight); *Acrida cinerea*; *Acrida exaltata*;  
*Aeneolamia contigua* (spotted spittlebug of pastures); *Aeneolamia flavilatera* (yellow-  
sided froghopper); *Aeneolamia varia* (froghopper); *Aeschynomene indica* (Northern  
jointvetch); *Ageratum conyzoides* (goat weed); *Agromyza oryzae* (rice leaf miner);  
5 *Agrotis segetum* (turnip moth); *Ahasverus advena* (foreign grain beetle);  
*Aleurocybotus indicus*; *Aleuroglyphus ovatus* (brownlegged grain mite); *Alphitobius*  
*diaperinus* (lesser mealworm); *Alternanthera philoxeroides* (alligator weed);  
*Alternanthera sessilis* (sessile joyweed); *Alternaria alternata* f.sp. *lycopersici*  
(alternaria leaf spot); *Alternaria padwickii* (stackburn disease); *Amaranthus*  
10 *retroflexus* (redroot); *Amaranthus spinosus* (spiny amaranthus); *Anadastus filiformis*;  
*Anadastus scutellatus*; *Anagallis arvensis* (scarlet pimpernel); *Anaphothrips*  
*obscurus* (grass thrips); *Anaphothrips sudanensis*; *Anisopteromalus calandrae*;  
*Anomala antiqua* (groundnut chafer); *Anomala dimidiata*; *Anomala pallida*;  
*Aphelenchoides besseyi* (rice leaf nematode); *Arthrinium phaeospermum*; *Aspavia*  
15 *armigera*; *Aspergillus parasiticus*; *Aspergillus terreus*; *Aspergillus ustus*; *Atherigona*  
*oryzae* (shoot fly); *Atractomorpha crenulata*; *Atta opaciceps*; *Atta sexdens* (leaf  
cutting ant); *Avena fatua* (wild oat); *Bacillus cereus*; *Bacillus subtilis*; *Balansia*  
*oryzae-sativae* (udbatta disease); *Balclutha abdominalis*; *Bandicota indica* (greater  
bandicoot rat); barley yellow dwarf viruses (barley yellow dwarf); bird pests; *Blattella*  
20 *germanica* (croton bug); *Blissus insularis* (southern chinch bug); *Blissus leucopterus*  
(chinch bug); *Boerhavia diffusa* (hogweed); *Borbo cinnara* (rice, leaf folder); *Borreria*  
*latifolia* (broadleaf buttonweed); *Brachiaria paspaloides* (common signal grass);  
*Brevennia rehi* (rice mealybug); Brome mosaic virus; *Burkholderia glumae* (bacterial  
grain rot); *Burkholderia plantarii*; *Cadra cautella* (dried currant moth); *Caliothrips*  
25 *striatopterus* (black thrips of maize); *Callosobruchus chinensis* (Chinese bruchid);  
*Carpophilus*; *Carpophilus dimidiatus* (corn-sap beetle); *Cassia obtusifolia*  
(sicklepod); *Caulopsis cuspidata* (longhorned paddy grasshopper); *Caulopsis*  
*gracillima* (longhorned grasshopper); *Caulopsis sponsa* (longhorned grasshopper);  
*Celosia argentea* (quailgrass); *Cenchrus echinatus* (bur grass); *Ceratobasidium*  
30 *cereale* (sharp eye spot of cereals); *Ceratophyllum demersum* (coontail); *Ceresa*  
*minor*; *Chaetocnema basalis*; *Chenopodium album* (fat hen); *Cheyletus malaccensis*;  
*Chilo agamemnon* (corn, borer, oriental); *Chilo auricilius* (gold-fringed rice borer);

- Chilo diffusilineus; Chilo partellus (spotted stem borer); Chilo plejadellus (rice stalk, borer (USA)); Chilo polychrysus (dark-headed striped borer); Chilo sacchariphagus (spotted borer); Chilo suppressalis (rice stem borer); Chilo zacconius; Chironomus kiiensis; Chironomus tepperi (bloodworm); Chloris barbata (purpletop chloris);
- 5 Chlorops oryzae (rice stem maggot); Chondracris rosea (citrus locust); Cleome viscosa (yellow mesembay); Cletus punctiger; Cletus trigonus (slender rice-bug); Cnaphalocrocis medinalis (rice leaf folder); Cochliobolus geniculatus (root rot: cereals); Cochliobolus lunatus (head mould of grasses, rice and sorghum); Cochliobolus miyabeanus (brown leaf spot of rice); Cochliobolus ravenelii (false
- 10 smut); Cochliobolus sativus (spot blotch); Cofana spectra (white leafhopper); Cofana unimaculata (white leafhopper); Collaria oleosa; Colposcelis signata; Commelina benghalensis (benghal dayflower); Commelina diffusa (water grass); Conocephaloides obscurellus; Conocephalus cinereus (longhorned green pasture grasshopper); Conocephalus propinquus (longhorned grasshopper); Conocephalus
- 15 saltator (longhorned grasshopper); Conyza canadensis (Canadian fleabane); Coptotermes (termites); Corchorus aestuans; Corcyra cephalonica (rice meal moth); Corticium rolfsii (sclerotium rot); Crassocephalum crepidioides; Criconemella (ring nematode); Cricotopus bicinctus; Cricotopus sylvestris; Cricotopus trifasciatus; Cryptolestes ferrugineus (rusty grain beetle); Cryptolestes pusillus (flat grain beetle);
- 20 Culicoides furens; Curvularia (black kernel); Cymoninus notabilis; Cynodon dactylon (Bermuda grass); Cyperus brevifolius (sedge); Cyperus compressus (annual sedge); Cyperus difformis (small-flowered nutsedge); Cyperus esculentus (yellow nutsedge); Cyperus iria (grasshopper's cyperus); Cyperus rotundus (nutgrass); Dactyloctenium aegyptium (crowfoot grass); Deois flavopicta (demerara, frog hopper); Diabrotica
- 25 speciosa (cucurbit beetle); Diasemopsis macrophthalma (stalk-eyed, borer); Diatraea centrella (stalk borer of sugarcane and rice); Diatraea lineolata (neotropical corn stalk borer); Dichelops melacanthus; Dieladispa armigera (paddy hispa); Digitaria ciliaris (tropical finger grass); Dimorphopterus; Dinoderus minutus (bamboo powder-post beetles); Diopsis apicalis; Diopsis longicornis (stalk-eyed fly); Ditylenchus
- 30 angustus (rice stem nematode); Doloessa viridis; Dolycoris baccarum (sloe, bug); Dolycoris indicus; Donacia provosti (rice, rootworm); Draeculacephala clypeata (sharp-headed leafhopper); Drechslera gigantea (eyespot); Dysdercus

- nigrofasciatus; Dysdercus supersticiosus; Dysmicoccus boninsis (pink sugarcane mealybug); Earias insulana (Egyptian stem borer); Echinochloa colonum (jungle rice); Echinochloa crus-galli (barnyard grass); Echinocnemus oryzae; Echinocnemus squameus (rice plant weevil); Eichhornia crassipes (water hyacinth); Elasmopalpus
- 5 lignosellus (lesser corn stalk borer); Eleusine indica (fowlfoot grass); Emilia sonchifolia (consumption weed); Entyloma oryzae (leaf smut of rice); Eoreuma loftini; Ephydra macellaria (fly, rice); Epicoccum nigrum (red blotch of grains); Epilachna similis (maize ladybird beetle); Eragrostis japonica (delicate lovegrass); Erwinia carotovora subsp. carotovora (bacterial root rot of sweet potato); Erwinia
- 10 chrysanthemi pv. chrysanthemi (bacterial wilt of Dahlia spp.); Euethela bidentata (bidentate scarab); Euphorbia helioscopia (sun spurge); Euphorbia hirta (garden spurge); Euproctis minor; Euproctis virguncula; Euproctis xanthorrhoea; Eurydema ventralis; Euscyrtus concinnus; Eysarcoris lewisi; Eysarcoris parvus (white spotted spined bug); Eysarcoris ventralis; Fimbristylis littoralis (lesser fimbriatilis);
- 15 Frankliniella intonsa (thrips, flower); Fusarium; Fusarium oxysporum; Fusarium proliferatum; Gaeumannomyces graminis var. graminis (crown sheath rot); Galinsoga parviflora (gallant soldier); Galium aparine (cleavers); Geomys lucifuga; Gibberella avenacea (Fusarium blight); Gibberella baccata (collar rot: coffee); Gibberella fujikuroi (bakanae disease of rice); Gibberella intricans; Gibberella zeae
- 20 (headblight of maize); Graminella nigrifrons (leafhopper, blackfaced); Gryllotalpa africana (african mole cricket); Gryllus assimilis (field cricket); Haplothrips aculeatus (grass thrips); Haplothrips ganglbaueri; Helicotylenchus dihystrer (common spiral nematode); Heliotropium europaeum (common heliotrope); Heliotropium indicum (Indian heliotrope); Helminthosporium sigmoideum var. irregulare (stem rot: rice);
- 25 Helodytes foveolatus (weevil, rice water); Herpetogramma phaeopteralis (grassworm); Heterodera glycines (soybean cyst nematode); Heterodera oryzae (rice cyst nematode); Heterodera oryzicola (rice cyst nematode); Heterodera sacchari (sugarcane cyst nematode); Heteronychus licas (black sugarcane beetle); Heteronychus lioderes; Hieroglyphus banian (rice grasshopper); Hieroglyphus
- 30 nigrorepletus; Hirschmanniella oryzae (rice root nematode); Hirschmanniella spinicaudata (rice root nematode); Holochilus brasiliensis; Holotrichia serrata (white grub); Holotrichia seticollis; Hoplolaimus indicus (lance nematode); Hoplolaimus

seinhorsti (lance nematode); Hortensia similis (common green sugarcane  
 leafhopper); Hydrellia deonieri (miner, rice leaf); Hydrellia griseola (rice leaf miner);  
 Hydrellia philippina (rice leaf miner); Hydrellia sasakii (paddy stem maggot);  
 Hydrellia; Hydrellia tomiokai; Hydrilla verticillata (aquatic weed); Hydronomidius  
 5 molitor; Hylephila phyleus (rice skipper); Hypocrea rufa (fruit rot: Citrus spp.);  
 Hypomeces squamosus (green weevil); Hysteroneura setariae (rusty plum aphid);  
 Ipomoea aquatica (water spinach); Ischaemum rugosum (wrinkled duck-beak);  
 Ischaemum timorense (centipede grass); Javesella pellucida; Keiferia lycopersicella  
 (tomato pinworm); Khuskia oryzae (cob rot of maize); Laelia suffusa; Lantana  
 10 camara (lantana); Laodelphax striatellus (small brown planthopper); Lasioderma  
 serricorne (cigarette beetle); Leersia hexandra (southern cut grass); Lemna  
 perpusilla (duckweed); Lepinotus reticulatus (booklouse, reticulatewinged); Leptispa  
 pygmaea (rice leaf beetle); Leptochloa chinensis (Asian sprangletop); Leptocorisa  
 acuta (rice seed bug); Leptocorisa chinensis (corbett rice, bug); Leptocorisa oratorius  
 15 (slender rice bug); Leptoglossus gonagra (squash bug); Leucopholis irrorata (toy  
 beetle); Leucopholis lepidophora (Areca white grub); Lindernia; Lindernia anagallis;  
 Lindernia antipoda; Lindernia ciliata; Lindernia crustacea; Lindernia procumbens  
 (common false pimpernel); Liposcelis bostrychophila (book louse); Liposcelis  
 entomophila (grain psocid); Liposcelis paeta (grain psocid); Lissorhoptrus  
 20 brevirostris; Lissorhoptrus isthmicus; Lissorhoptrus oryzophilus (American water  
 weevil); Lithacodia distinguenda (rice false looper); Locusta migratoria (migratory  
 locust); Lonchura punctulata (munia, spotted); Lonchura; Longula malaca;  
 Lophocateres pusillus (nicaraguan grain beetle); Ludwigia adscendens (water  
 primrose); Ludwigia hyssopifolia (water primrose); Ludwigia octovalvis (primrose  
 25 willow); Macrophomina phaseolina (charcoal rot of bean/tobacco); Macrosteles  
 quadrilineatus (aster leafhopper); Macrosteles strifrons; Magnaporthe grisea (rice  
 blast disease); Magnaporthe salvinii (stem rot); Maliarpha separatella (rice, borer,  
 white); Marasmia exigua (rice leaf roller); Marasmia patnalis (rice leafroller);  
 Marasmia ruralis (rice leaf roller); Marasmia trapezalis (maize webworm); Marsilea  
 30 minuta (airy pepperwort); Melanitis leda ismene (rice butterfly); Melanitis suyadana;  
 Melochia corchorifolia (redweed); Meloidogyne arenaria (peanut root-knot  
 nematode); Meloidogyne exigua (coffee root-knot nematode); Meloidogyne

- graminicola (rice root knot nematode); Meloidogyne incognita (root-knot nematode); Memnoniella echinata; Menida histrio; Microcephalothrips abdominalis (composite, thrips); Mimosa pigra (giant sensitive plant); Mimosa pudica (mimosa); Mocis frugalis; Mocis latipes (grass looper); Monochoria vaginalis (pickerel weed);
- 5 Monographella albescens (leaf scald); Monographella nivalis (foot rot: cereals); Mormidea angustata; Mormidea guerini; Mormidea pictiventris (stinkbug); Mormidea ypsilon (stinkbug); Mus musculus domesticus (mouse); Mycalesis horsfieldi; Mycosphaerella holci (glume blight); Mycosphaerella tassiana (rot of pepper fruits); Mycovelloosiella oryzae (white leaf streak); Myriophyllum aquaticum (parrot-feather);
- 10 Myriophyllum spicatum (spiked watermilfoil); Mythimna (cutworm); Mythimna latiuscula; Mythimna loreyi (maize caterpillar); Mythimna separata (paddy armyworm); Mythimna unipuncta (rice armyworm); Mythimna venalba; Najas graminea (grassy naiad); Najas marina (hollyleaf naiad); Najas minor (spinyleaf naiad); Naranga diffusa (rice green semilooper); Nectria haematococca var.
- 15 brevicona (dry rot of potato); Nectria rigidiuscula (green point gall); Neoconocephalus maxillosus (longhorned grasshopper); Nephotettix; Nephotettix cincticeps (rice green leafhopper); Nephotettix malayanus; Nephotettix nigropictus (rice green leafhopper); Nephotettix parvus; Nephotettix virescens (green paddy leafhopper); Nezara viridula (green stink bug); Nilaparvata bakeri; Nilaparvata lugens
- 20 (brown-backed rice plant hopper; BPH); Nilaparvata maeander; Nisaga simplex; Nisia nervosa (grey planthopper); Nomadacris septemfasciata (red locust); Oebalus insularis (island stinkbug); Oebalus ornatus (rice stink bug); Oebalus poecilus; Oebalus pugnax (rice stinkbug); Oebalus ypsiloinoides (paddy bug); Oebalus ypsilongriseus; Oligonychus oryzae; Omalonyx felina (slug); Orphulella punctata;
- 25 Orseolia oryzae (rice stem gall midge); Orseolia oryzivora (African rice gall midge); Oryza longistaminata (perennial wild rice); Oryza rufipogon (red rice); Oryzaephilus surinamensis (saw toothed grain beetle); Oryzophagus oryzae; Oulema oryzae (rice leaf beetle); Oxalis corniculata (creeping woodsorrel (USA)); Oxalis latifolia (sorrel); Oxya chinensis (rice grasshopper); Oxya japonica; Oxya nitidula; Oxya spp. (rice
- 30 field grasshopper); Oxya yezoensis (grasshopper, Japanese); Palorus ratzeburgi (small-eyed flour beetle); Panicum repens (torpedo grass); Paralongidorus australis (needle nematode); Parapoynx fluctuosalis; Parapoynx stagnalis (rice case bearer);

*Parasa bicolor*; *Parnara guttatus* (rice skipper); *Parnara naso*; *Paspalum conjugatum* (sour grass); *Paspalum distichum* (knotgrass); *Patanga guttulosa* (locust, spur-throated); *Pelopidas mathias* (rice skipper); *Perkinsiella saccharicida* (sugarcane leafhopper); *Pestalotia disseminata* (leaf spot: *Eucalyptus* spp.); *Petrobia latens*  
 5 (brown wheat mite); *Phalera combusta*; *Phlugis mantispa* (long-horned grasshopper); *Phlugis teres*; *Phoma levellei* (sheath blotch); *Phomopsis oryzae-sativae* (collar rot); *Phragmites australis* (common reed); *Phthia obscura*; *Phthia picta* (black bug); *Phyllopertha horticola* (bracken clock); *Phyllophaga helleri*; *Piezodorus guildinii* (stink bug); *Pila dolioides* (snail, golden apple); *Pistia stratiotes*  
 10 (water lettuce); *Ploceus cucullatus* (rice weaver bird); *Plodia interpunctella* (Indian meal moth); *Poa annua* (annual meadowgrass); *Podontia quattuordecimpunctata*; *Polygonum aviculare* (knotweed); *Polygonum barbatum* (knot grass); *Polygonum hydropiper* (marsh pepper); *Polymyxa graminis* (vector of streak mosaic: wheat); *Polypedilum cultellatum*; *Pomacea canaliculata* (golden snail); *Pomacea glauca*;  
 15 *Portulaca oleracea* (pussley); *Pratylenchus brachyurus* (root-lesion nematode); *Pratylenchus penetrans* (nematode, northern root lesion); *Pratylenchus zeae* (root lesion nematode); *Psalis pennatula* (hairy rice caterpillar); *Psammotettix striatus*; *Pseudocochliobolus eragrostidis* (leaf spot: maize); *Pseudomonas aeruginosa*; *Pseudomonas fluorescens* (pink eye: potato); *Pseudomonas fuscovaginae* (sheath  
 20 brown rot); *Pseudomonas putida* (biocontrol: *Erwinia* spp.); *Pseudomonas syringae* pv. *oryzae* (halo blight); *Pseudomonas syringae* pv. *syringae* (bacterial canker or blast (stone and pome fruits)); *Pseudomonas syringae* pv. *zizaniae* (bacterial leaf streak); *Pseudomonas syringae*; *Pyrallis farinalis* (meal moth); *Pythium arrhenomanes* (cereals root rot); *Pythium graminicola* (gramineae seedling blight);  
 25 *Pythium irregulare* (black: beet vascular necrosis); *Pythium spinosum* (root rot: ornamentals); *Pythium ultimum*; *Rattus argentiventer* (rice field rat); *Rattus exulans* (bush rat); *Rattus norvegicus* (brown rat); *Rattus rattus* (black rat); *Rattus rattus diardii* (Malaysian house rat); *Rattus rattus mindanensis* (common Philippine field rat); *Recilia dorsalis* (zigzag leafhopper); *Rhizoctonia*; *Rhizoctonia oryzae* (sheath  
 30 spot); *Rhizoglyphus robini*; *Rhopalosiphum maidis* (maize aphid); *Rhopalosiphum padi* (oat aphid); *Rhopalosiphum rufiabdominale* (rice root aphid); *Rhyzopertha dominica* (American wheat weevil); Rice black streaked dwarf virus; rice dwarf virus

(dwarf disease of rice); rice gall dwarf virus; rice grassy stunt virus; rice hoja blanca virus (white leaf disease of rice); rice ragged stunt virus; rice stripe necrosis furovirus; rice stripe virus (rice stripe tenuivirus); rice transitory yellowing rhabdovirus (rice yellow stunt virus); rice tungro bacilliform virus; rice tungro disease (rice tungro virus); rice tungro spherical virus; rice yellow dwarf phytoplasma; rice yellow mottle virus; *Richardia brasiliensis* (white-eye (Australia)); *Rivula atimeta* (green hairy caterpillar); *Rottboellia cochinchinensis* (itch grass); *Rupela albinella* (south American white borer (of rice)); *Saccharum spontaneum* (wild sugarcane); *Sagittaria guyanensis* (lesser arrow-head); *Salvinia molesta* (kariba weed); *Sarocladium oryzae* (rice sheath rot); *Scapteriscus* (mole crickets); *Scapteriscus didactylus* (Puerto Rican mole cricket); *Scaptocoris castaneus* (subterranean stink bug); *Schistocerca pallens* (American grasshopper); *Schizaphis graminum* (spring green aphid); *Scirpophaga incertulas* (yellow stem borer); *Scirpophaga innotata* (white rice stem borer); *Scirpophaga nivella* (white rice borer); *Scirpus grossus* (greater club rush); *Scirpus juncoides* (bulrush); *Scirpus maritimus* (saltmarsh bulrush); *Sclerophthora macrospora* (downy mildew); *Sclerotium fumigatum*; *Sclerotium hydrophilum*; *Scotinophara cinerea*; *Scotinophara*; *Scotinophara coarctata* (black rice bug); *Scotinophara latiuscula*; *Scotinophara lurida* (black rice bug); *Sesamia calamistis* (African pink stem borer); *Sesamia cretica* (greater sugarcane borer); *Sesamia inferens* (purple stem borer); *Sesamia nonagrioides* (Mediterranean corn stalk borer); *Sesamia nonagrioides botanephaga*; *Sesamia uniformis* (shoot boring caterpillar); *Setaria parviflora* (knotroot foxtail); *Setaria pumila* (yellow foxtail); *Setaria verticillata* (bristly foxtail); *Setaria viridis* (green foxtail); *Setomorpha rutella*; *Setosphaeria holmii*; *Setosphaeria rostrata* (leaf spot of grasses); *Sida acuta* (broomweeds); *Sigmodon* (field rat); *Sitophilus oryzae* (lesser grain weevil); *Sitophilus zeamais* (greater grain weevil); *Sitotroga cerealella* (grain moth); *Sogatella wallicci*; *Sogatella furcifera* (white-backed planthopper; WBPH); *Sogatella vibix* (white-backed planthopper); *Sorghum halepense* (Johnson grass); *Sphaerulina oryzina* (narrow brown leaf spot); *Sphenoclea zeylanica* (wedgewort); *Spodoptera cilium* (caterpillar, lawn); *Spodoptera exempta* (black armyworm); *Spodoptera exigua* (beet armyworm); *Spodoptera frugiperda* (fall armyworm); *Spodoptera littoralis* (leafworm, Egyptian cotton); *Spodoptera litura* (taro caterpillar); *Spodoptera mauritia*

(paddy swarming caterpillar); *Spodoptera mauritia acronyctoides* (armyworm); *Spodoptera ornithogalli* (yellow striped armyworm); *Stegobium paniceum* (drugstore beetle); *Stenchaetothrips biformis* (rice thrips); *Stenopola dorsalis*; *Stenotus rubrovittatus* (sorghum plantbug); *Striga angustifolia* (witchweed); *Striga aspera* (witchweed); *Striga hermonthica* (witchweed); *Striga lutea* (witch weed); *Synedrella nodiflora* (synedrella); *Tagosodes cubanus* (paddy plant hopper); *Tagosodes orizicolus* (rice delphacid); *Tagosodes pusanus*; *Tarbinskiellus portentosus* (rice field cricket); *Tarsonemus fuzhouensis*; *Tarsonemus talpae*; *Telicota augias*; *Tenebroides mauritanicus* (cadelle); *Tetraneura nigriabdominalis* (rice root aphid); *Tetranychus urticae* (two-spotted spider mite); *Thaia oryzivora* (orange rice leafhopper); *Thaia subrufa*; *Thanatephorus cucumeris* (many names, depending on host); *Thioptera botyoides*; *Thrips palmi* (melon thrips); *Thyanta perditor* (brown stem bug); *Tibraca limbativentris* (stinkbug); *Tilletia barclayana* (black smut of rice); *Tipula aino* (crane fly, rice); *Toya propinqua*; *Trianthema portulacastrum* (horse purslane); *Tribolium castaneum* (red flour beetle); *Tribolium confusum* (confused flour beetle); *Trichispa sericea* (rice, hispid); *Trichodorus* (stubby root nematodes); *Tridactylus minutus*; *Trigonotylus coelestialium* (rice leafbug); *Trigonotylus ruficornis*; *Trogoderma granarium* (khapra beetle); *Trogoderma variabile* (grain dermestid); *Tylenchorhynchus annulatus* (stunt nematode); *Tylenchorhynchus brevilineatus* (pod scab nematode); *Typhaea stercorea* (hairy fungus beetle); *Typhula ishikariensis* (speckled cereals snow mould); *Tyrophagus putrescentiae* (cereal mite); *Ulomoides dermestoides*; *Uromyces coronatus* (rust of rice); *Ustilaginoidea virens* (false smut); *Utricularia aurea* (bladderwort); *Xanthomonas campestris* (black rot of crucifers); *Xanthomonas oryzae* pv. *oryzae* (rice leaf blight); *Xanthomonas oryzae* pv. *oryzicola* (bacterial leaf streak of rice); *Xiphinema* (dagger nematode); *Xiphinema americanum* (dagger nematode); *Xiphinema ifacolum* (dagger nematode); *Zeros orientalis*; *Zulia entreriana*.

An additional aspect is processes for applying plant protection composition according to the invention of liquid AL formulation type. The suitable standard processes for this are known to a person skilled in the art. Generally, it is advantageous to apply the plant protection composition by use of water-soluble

bottles, sheet bags or other containers on the edge of rice paddy fields or to apply it on the surface of the water of the rice paddy fields, either dropwise from special shake bottles or by spraying with knapsack sprayers or similar devices.

- 5 The invention is illustrated by the following examples, without being limited to these.
  1. Preparation example: Plant protection composition of formulation type AL (Any other liquid; ready-for-use solution) – Variant 1 (AL1)
- 10 In this connection, the active substance concentrate was prepared and was subsequently mixed with solvents and wetting agents.

Table 1.1 - Preparation: Active substance concentrate AL1

Constituent	Composition (g)	Comment
Purasolv® EHL	650.00	2-Ethylhexyl lactate
Ethiprole	30.00	Active substance (agrochemical)

Table 1.2 - Preparation: Plant protection composition AL1

Constituent	Composition (g)	Comment
Active substance concentrate AL1	680.00	
DMSO	300.00	Solvent
Break Thru OE 441®	20.00	Wetting agent

5

2. Preparation example: Plant protection composition of formulation type AL (Any other liquid; ready-for-use solution) – Variant 2 (AL2)

In this connection, the active substance concentrate was prepared and was subsequently mixed with solvents and wetting agents.

10

Table 2.1 - Preparation: Active substance concentrate AL2

Constituent	Composition (g)	Comment
Purasolv® EHL	625.00	2-Ethylhexyl lactate
BPMC	200.00	Active substance (agrochemical)
Ethiprole	20.00	Active substance (agrochemical)

Table 2.2 - Preparation: Plant protection composition AL2

Constituent	Composition (g)	Comment
Active substance concentrate AL2	845.00	
DMSO	113.30	Solvent
Break Thru OE 441®	20.00	Wetting agent

3. Preparation example: Plant protection composition of formulation type AL (Any other liquid; ready-for-use solution) – Variant 3 (AL3)

5

In this connection, the active substance concentrate was prepared and was subsequently mixed with solvents and wetting agents.

Table 3.1 - Preparation: Active substance concentrate AL3

Constituent	Composition (g)	Comment
Purasolv® EHL	100.00	2-Ethylhexyl lactate
Thiodicarb	25.00	Active substance (agrochemical)

10 Table 3.2 - Preparation: Plant protection composition AL3

Constituent	Composition (g)	Comment
Active substance concentrate AL3	125.00	
Benzyl alcohol	861.60	Solvent
Break Thru OE 440®	50.00	Wetting agent

4. Preparation example: Plant protection composition of formulation type AL (Any other liquid; ready-for-use solution) – Variant 4 (AL4)

15 In this connection, the active substance concentrate was prepared and was subsequently mixed with solvents and wetting agents.

Table 4.1 - Preparation: Active substance concentrate AL4

Constituent	Composition (g)	Comment
Purasolv® EHL	100.00	2-Ethylhexyl lactate
Thiodicarb	30.00	Active substance (agrochemical)

Table 4.2 - Preparation: Plant protection composition AL4

Constituent	Composition (g)	Comment
Active substance concentrate AL4	130.00	
Benzyl alcohol	863.50	Solvent
Break Thru OE 440®	50.00	Wetting agent

- 5 5. Preparation example: Plant protection composition of formulation type AL (Any other liquid; ready-for-use solution) – Variant 5 (AL5)

In this connection, the active substance concentrate was prepared and was subsequently mixed with solvents and wetting agents.

10 Table 5.1 - Preparation: Active substance concentrate AL5

Constituent	Composition (g)	Comment
Purasolv® EHL	100.00	2-Ethylhexyl lactate
Thiodicarb	30.00	Active substance (agrochemical)
Ethiprole	7.50	Active substance (agrochemical)

Table 5.2 - Preparation: Plant protection composition AL5

Constituent	Composition (g)	Comment
Active substance concentrate AL5	137.50	

Benzyl alcohol	854.00	Solvent
Break Thru OE 440®	50.00	Wetting agent

6. Preparation example: Plant protection composition of formulation type AL (Any other liquid; ready-for-use solution) – Variant 6 (AL6)

- 5 In this connection, the active substance concentrate was prepared and was subsequently mixed with solvents and wetting agents.

Table 6.1 - Preparation: Active substance concentrate AL6

Constituent	Composition (g)	Comment
Purasolv® EHL	100.00	2-Ethylhexyl lactate
Thiodicarb	20.00	Active substance (agrochemical)
Ethiprole	5.00	Active substance (agrochemical)

10 Table 6.2 - Preparation: Plant protection composition AL6

Constituent	Composition (g)	Comment
Active substance concentrate AL6	125.00	
Benzyl alcohol	861.20	Solvent
Break Thru OE 440®	50.00	Wetting agent

7. Preparation example: Plant protection composition of the formulation type GR (Granule) - Variant 1 (GR1)

- 15 In this connection, the active substance concentrate was prepared and was subsequently adsorbed on an inert material.

Table 7.1 - Preparation: Active substance concentrate GR1

Constituent	Concentration (% by weight)	Comment
Purasolv® EHL	16.7	2-Ethylhexyl lactate
Ethiprole	6.7	Active substance (agrochemical)
Hallcomid M8-10®	76.6	Solvent

Table 7.2 - Preparation: Plant protection composition GR1

Constituent	Concentration (% by weight)	Comment
Active substance concentrate GR1	15	
Sepiolite 30/60 mesh®	85	Inert material

- 5 8. Preparation example: Plant protection composition of the formulation type GR  
(Granule) - Variant 2 (GR2)

In this connection, the active substance concentrate was prepared and was subsequently adsorbed on an inert material.

10

Table 8.1 - Preparation: Active substance concentrate GR2

Constituent	Concentration (% by weight)	Comment
Purasolv® EHL	50	2-Ethylhexyl lactate
Ethiprole	5	Active substance (agrochemical)
DMSO	45	Solvent

Table 8.2 - Preparation: Plant protection composition GR2

Constituent	Concentration (% by weight)	Comment
Active substance concentrate GR2	2	
Monopropylene glycol	4	Adjuvant
Biodac carrier 20/40 mesh®	94	Inert material

9. Preparation example: Plant protection composition of the formulation type EC  
(Emulsifiable concentrate)

- 5 In this connection, the active substance concentrate was prepared and was subsequently mixed with emulsifiers.

Table 9.1 - Preparation: Active substance concentrate EC

Constituent	Composition (g)	Comment
Purasolv® EHL	150.0	2-Ethylhexyl lactate
Deltamethrin	25.0	Active substance (agrochemical)
Solvesso 100®	645.9	Solvent

Table 9.2 - Preparation: Plant protection composition EC

Constituent	Composition (g)	Comment
Active substance concentrate EC	820.9	
Acetic acid	0.1	Active substance stabilizer
BHT	1.0	Active substance stabilizer
Emulsogen EL 360®	21.0	Emulsifier, nonionic
Ca dodecylbenzene-sulfonate	49.0	Emulsifier, anionic

10. Preparation example: Plant protection composition of the formulation type EW  
(Emulsion, oil in water)

5

In this connection, the active substance concentrate was prepared and was subsequently emulsified in water. The concentrated emulsion was then stabilized.

Table 10.1 - Preparation: Active substance concentrate EW

Constituent	Composition (g)	Comment
Purasolv® EHL	50.00	2-Ethylhexyl lactate
Deltamethrin	12.50	Active substance (agrochemical)
Cyclohexanone	125.00	Solvent
Benzyl benzoate	125.00	Solvent

10

Table 10.2 - Preparation: Plant protection composition EW

Constituent	Composition (g)	Comment
Active substance concentrate EW	312.50	
Methyl paraben®	0.10	Preservative
Propyl paraben®	0.10	Preservative
Empiphos O3D®	10.00	Emulsifier (anionic)
Witconol NS 500 K®	17.50	Emulsifier (nonionic)
Genapol X060®	17.50	Emulsifier (nonionic)
Polyvinylpyrrolidone K 90®	15.00	Flow stabilizer
Citric acid	0.20	Active substance stabilizer
Rhodorsil 416®	0.20	Antifoam agent
Rhodorsil 426R®	0.20	Antifoam agent
Monopropylene glycol	120.00	Antifreeze agent
Water	525.00	

11. Preparation example: Plant protection composition of the formulation type ME  
(Microemulsion)

In this connection, the active substance concentrate was prepared and was subsequently emulsified in water to give a microemulsion.

10 Table 11.1 - Preparation: Active substance concentrate ME

Constituent	Composition (g)	Comment
Purasolv® EHL	20.00	2-Ethylhexyl lactate
Deltamethrin	50.00	Active substance (agrochemical)
Anisole	236.00	Solvent

Cyclohexanone	139.00	Solvent
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Table 11.2 - Preparation: Plant protection composition ME

Constituent	Composition (g)	Comment
Active substance concentrate ME	445.00	
Citric acid	0.20	Active substance stabilizer
Hexylene glycol	130.00	Antifreeze agent
Soprophor BSU®	144.00	Emulsifier, nonionic
Soprophor 4D384®	36.00	Emulsifier, anionic
Water	254.80	

## 12. Preparation example: Plant protection composition of the formulation type EG (Emulsifiable granule)

In this connection, the active substance concentrate was prepared. Subsequently, an emulsion of the active substance concentrate was sprayed over inert materials in a granulation apparatus.

Table 12.1 - Preparation: Active substance concentrate EG

Constituent	Concentration (% by weight)	Comment
Purasolv® EHL	3.3	2-Ethylhexyl lactate
Deltamethrin	11.0	Active substance (agrochemical)
Solvesso 200®	45.1	Solvent
Tributyl phosphate	40.7	Solvent

Table 12.2 - Preparation: Plant protection composition EG

Constituent	Concentration (% by weight)	Comment
Active substance concentrate EG	45.50	
Mowiol 3-83®	27.50	Inert material
Mowiol 4-88®	13.50	Inert material
Dispersing agent 1494®	11.00	Dispersing agent
Ca dodecylbenzene- sulfonate	0.55	Emulsifier (anionic)
Citric acid	0.35	Active substance stabilizer
Rhodorsil 416®	0.30	Antifoam agent
Rhodorsil 426R®	0.30	Antifoam agent
Water	1.00	Moistening

13. Preparation example: Plant protection composition of the formulation type SE  
(Suspoemulsion)

5

In this connection, the active substance concentrate was prepared. An emulsion of the active substance concentrate was pulverized in an aqueous composition with a second agrochemical active substance, the solid particles of which were subsequently dispersed.

10

Table 13.1 - Preparation: Active substance concentrate SE

Constituent	Composition (g)	Comment
Purasolv® EHL	150.00	2-Ethylhexyl lactate
Deltamethrin	10.00	Active substance (agrochemical)
Acetophenone	50.00	Solvent

Table 13.2 - Preparation: Plant protection composition SE

Constituent	Composition (g)	Comment
Active substance concentrate SE	210.00	
Ethiprole	100.00	2nd Active substance (agrochem.)
Soprophor FLK®	50.00	Dispersing agent
Rhodopol G®	2.75	Thickening agent
Proxel GXL®	1.00	Preservative
Rhodorsil 416®	5.00	Antifoam agent
Monopropylene glycol	60.00	Antifreeze agent
Geroxon SDS®	15.00	Wetting agent
Acetic acid	0.10	Active substance stabilizer
BHT	0.40	Active substance stabilizer
Soprophor BSU®	25.00	Emulsifier (nonionic)
Water	540.75	

14. Preparation example: Plant protection composition of the formulation type SL  
(Soluble concentrate)

5

In this connection, the active substance concentrate was prepared and was subsequently mixed with solvents and surfactants.

Table 14.1 - Preparation: Active substance concentrate SL

Constituent	Composition (g)	Comment
Purasolv® EHL	25.00	2-Ethylhexyl lactate
Acetamiprid	125.00	Active substance (agrochemical)

Table 14.2 - Preparation: Plant protection composition SL

Constituent	Composition (g)	Comment
Active substance concentrate SL	150.00	
DMSO	320.00	Solvent
$\gamma$ -Butyrolactone	115.00	Solvent
Benzyl alcohol	300.00	Solvent
Synperonic A3®	120.00	Surfactant
Soprophor DSS 15®	80.00	Surfactant

The following were used in the abovementioned examples: Purasolv® EHL (2-ethylhexyl lactate; Purac Biochem, Gorinchem, NL, or Barcelona, Spain), ethiprole (common name), DMSO (Krahn Chemie/Interorgana, Hamburg, GER), Break Thru OE 441® (polydimethylsiloxane; Goldschmidt, Essen, GER), BPMC (common name), thiodicarb (common name), benzyl alcohol (various suppliers), Break Thru OE 440® (polydimethylsiloxane; Goldschmidt, Essen, GER), Hallcomid M8-10® (CP Hall, Chicago, USA), Sepiolite 30/60 mesh® (Tolsa SA, Madrid, Spain),

monopropylene glycol (Sigma-Aldrich, Taufkirchen, GER), Biodac Carrier 20/40 mesh® (Sasol, Hamburg, GER), deltamethrin (common name), Solvesso 100® (aromatic hydrocarbon fluid; Exxon, Cologne, GER), acetic acid (various suppliers), BHT (butylated hydroxytoluene; Fluka, GER), Emulsogen EL 360® (fatty acid polyglycol esters; Clariant, Frankfurt, GER), Ca dodecylbenzenesulfonate (chemical group; e.g. Akzo Nobel, Düren, GER), cyclohexanone (Sigma Aldrich, Taufkirchen, GER), benzyl benzoate (Sigma Aldrich, Taufkirchen, GER), Methyl paraben® (Chemag, Frankfurt, GER), Propyl paraben® (Chemag, Frankfurt, GER), Empiphos O3D® (complex organic phosphate ester; Huntsman, Neu-Isenburg, GER), Witconol NS 500 K® (polyoxyethylene polyoxypropylene block copolymer; Osi/Akzo Nobel, Frankfurt, GER), Genapol X060® (ethoxylated alcohols; Clariant, Frankfurt, GER), Polyvinylpyrrolidone K 90® (syn. Luviskol K90; BASF, Ludwigshafen, GER), citric acid (various suppliers), Rhodorsil 416® (antifoam; Rhodia, Frankfurt, GER), Rhodorsil 426R® (antifoam; Rhodia, Frankfurt, GER), anisole (e.g. Rhodiasolv

MPE®, Rhodia, Frankfurt, GER), hexylene glycol (Sigma-Aldrich, Taufkirchen, GER), Soprophor BSU® (tristyrylphenol + 16 EO; Rhodia, Frankfurt, GER), Solvesso 200® (aromatic hydrocarbon fluid; Exxon, Cologne, GER), tributyl phosphate (e.g. Merck or Bayer, GER), Mowiol 3-83® (Kuraray, Frankfurt, GER), Mowiol 4-88® (Kuraray, Frankfurt, GER), Dispersing agent 1494® (Clariant; Frankfurt, GER), acetophenone (Haarmann & Reimer, Holzminden, GER), Soprophor FLK® (polyaryl alkoxylate phosphate ester, potassium salt; Rhodia, Frankfurt, GER), Rhodopol G® (Rhodia, Frankfurt, GER), Proxel GXL® (Avecia, Frankfurt, GER), Geropon SDS® (dioctyl sulfosuccinates; Rhodia, Frankfurt, GER), acetic acid (various suppliers), acetamiprid (common name),  $\gamma$ -butyrolactone (Sigma-Aldrich, Taufkirchen, GER), Synperonic A3® (synthetic primary alcohol ethylene oxide condensate; Uniqema, Everberg, Belgium), Soprophor DSS 15® (ethoxylated distyrylphenols; Rhodia, Frankfurt, GER).

## 15. Biological example 1: Greenhouse experimental results

### Procedure:

The formulations AL1 and AL2 (see preparation examples 1 and 2 for the preparation and composition) were tested. The rice paddy field harmful organism controlled was the rice cicada *Nilaparvata lugens* (brown-backed rice plant hopper; BPH).

Each time, 40-50 rice plant seedlings (*Oryza sativa*; variety: Balilla) per pot were cultivated in standard soil (ED73) for 10 days before the beginning of the experiment. One day before the application, the soil surface was covered with quartz sand and the pots were placed in sufficiently high receptacles which were subsequently filled with tap water up to just beneath the soil surface (pot top edge). Approximately 50 rice cicadas (development stage: late nymphs to early adults) were then transferred into each pot. Everything was subsequently covered with a perforated plastic bag. After the colonization of the plants by the rice cicadas, the water level in the receptacle was gradually topped up until above the level of the soil surface (pot top

edge). The water level necessary for the experiment was reached when the area of the water amounted in total to a fixed area in cm<sup>2</sup>.

The application was carried out by pipetting a fixed amount onto the surface of the water. The dosages tested were equivalent to 3, 4 and 5 l/ha. The following individual results are based on 2 repetitions, consisting each time of 4 pots with rice plants.

The evaluation was carried out 1, 4, 7 and 13 days after application (DAA). In this connection, the number of living rice cicadas was determined and the degree of effectiveness was calculated in % (using the Henderson-Tilton formula).

#### Results:

Table 15 - Activity against the rice cicada *Nilaparvata lugens* (BPH)

Formulation	Dosage (l/ha)	Evaluation after ...								
		0 DAA (§)	1 DAA		4 DAA		7 DAA		13 DAA	
		Ø No.	Ø No.	Ø %	Ø No.	Ø %	Ø No.	Ø %	Ø No.	Ø %
Untreated	-	290	290	0.0	285	0.0	148	0.0	800 (*)	0.0
AL1	5	242.5	10	95.9	0	100.0	0	100.0	0	100.0
	4	295	85	71.8	0	100.0	0	100.0	0	100.0
	3	250	97.5	61.0	0	100.0	0	100.0	0	100.0
AL2	5	255	1.5	99.4	0	100.0	0	100.0	0	100.0
	4	270	6	97.8	0	100.0	0	100.0	0	100.0
	3	305	10	96.7	0	100.0	0	100.0	0	100.0

(§) = Number before application; Ø No. = Mean number; Ø % = Mean degree of effectiveness; (\*) Appearance of rice cicadas of the next generation.

## Comments:

The activity of the agrochemical active substance ethiprole against the harmful organism *Nilaparvata lugens* was obtained quickly (after 1 DAA) and with lasting effect (after 13 DAA) with both AL formulations.

5

### 16. Biological example 2: Greenhouse experimental results with regard to plant damage

Procedure (see biological example 1):

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The plant damage was determined 7 and 13 days after application (DAA). In this connection, the growth and phenotype of the rice plants were rated in % plant damage (high % values in this connection characterize serious plant damage).

15

Table 16 - Plant damage in %

Formulation n	Dosage (l/ha)	Scoring after 7 DAA			Scoring after 13 DAA		
		Rep. A	Rep. B	Ø %	Rep. A	Rep. B	Ø %
Untreated	-	20	15	17.5 (\$)	25	25	25 (\$)
AL1	5	2	1	1.5	2	1	1.5
	4	3	2	2.5	3	2	2.5
	3	0	1	0.5	0	1	0.5
AL2	5	5	3	4	4	6	5
	4	1	2	1.5	1	2	1.5
	3	0	2	1	0	2	1

Rep. = Repetition; Ø % = Mean of the repetitions; (\$) Inhibited growth detectable

Comment:

The two AL formulations tested proved to be, in this greenhouse experiment, well tolerated by the rice plants tested.

5

### 17. Biological example 3: Field trial results

Procedure:

- 10 The formulation AL1 (see preparation example 1 for the preparation and composition) was tested in comparison with a standard EC formulation: AL1 with 3% by weight of ethiprole in the dosages 50 (dose 1), 83 (dose 2), 117 (dose 3) and 150 (dose 4) g/ha and standard EC with 10% by weight of ethiprole in the dosages 15 (dose 1), 25 (dose 2), 35 (dose 3) and 45 (dose 4) g/ha, doses 1 to 4 each time
- 15 comprising identical amounts of the agrochemical active substance ethiprole.

- The field trial locations were JiangSu-RF, HuN-IPP and Xiushan PPS-CQ in China. The formulations comprising active substance were applied in the rice paddy fields by hand spraying with a knapsack sprayer. Test plot layout was according to the
- 20 RCB method with a plot size of 30 m<sup>2</sup> each time. The following individual results per location are based on 3 repetitions each time.

- The rice paddy field harmful organisms controlled were the rice cicadas *Nilaparvata lugens* (brown-backed rice plant hopper; BPH) and *Sogatella furcifera* (white-backed
- 25 plant hopper; WBPH), which occurred at the infestation level naturally present at the location. In addition, the secondary action on useful spiders was ascertained.

- The control outcome or the secondary action was determined on different days after treatment (= DAT) in % control (= reduction in the number of organisms in
- 30 comparison with the untreated control) or % secondary action.

## Results:

Table 17.1 - Location: HuN-IPP

Dose	Formulation	% Control of BPH after...					
		1DAT	3DAT	7DAT	14DAT	21DAT	28DAT
1	AL1	78.1	96.7	92.1	98.0	99.2	97.6
	Standard EC	51.5	68.9	83.6	97.1	96.3	88.7
2	AL1	81.8	97.2	96.2	98.1	99.1	98.7
	Standard EC	64.0	76.9	90.7	97.8	97.4	96.0
3	AL1	89.4	98.9	100	100	100	99.0
	Standard EC	76.9	89.6	96.8	99.2	97.6	96.2
4	AL1	90.9	100	100	100	100	99.7
	Standard EC	79.2	92.1	97.8	99.4	98.5	96.9

Application on 9.13.2001; mean level of infestation by BPH before the treatment: 323

5 insects/20 hills (= group of rice plants).

Table 17.2 - Location: Xiushan PPS-CQ

Dose	Formulation	% Control of WBPH after ...					
		1DAT	3DAT	7DAT	14DAT	21DAT	28DAT
1	AL1	43.9	52.2	75.5	68.1	49.1	33.2
	Standard EC	28.5	43.5	53.4	68.3	53.0	46.9
2	AL1	44.8	61.8	75.3	80.4	71.6	74.6
	Standard EC	30.1	49.9	72.5	75.8	58.9	65.1
3	AL1	45.6	62.4	79.1	80.6	61.9	51.9
	Standard EC	33.3	51.1	74.0	83.9	66.0	65.9
4	AL1	51.4	70.3	86.6	87.3	70.5	71.6
	Standard EC	36.9	51.1	81.1	81.7	75.0	69.8

Application on 7.6.2001; mean level of infestation by WBPH before the treatment:

983 insects/20 hills (= group of rice plants).

Table 17.3 - Location: JiangSu-RF

Dose	Formulation	% Control of WBPH after ...					
		1DAT	3DAT	7DAT	14DAT	21DAT	28DAT
1	AL1		37.8	47.2	61.3	70.2	63.8
	Standard EC		18.2	23.6	46.9	62.6	59.5
2	AL1	29.0	56.4	65.4	73.2	86.3	83.7
	Standard EC	4.6	25.9	36.4	38.6	58.3	53.9
3	AL1	19.4	42.8	49.6	73.8	83.8	76.6
	Standard EC	4.3	33.2	38.5	53.5	65.2	60.5
4	AL1	15.7	48.3	55.0	70.4	79.3	84.0
	Standard EC	7.8	43.2	45.1	61.8	68.3	75.3

Application on 8.8.2001; mean level of infestation by WBPH before the treatment:  
3128 insects/20 hills (= group of rice plants).

## 5 Table 17.4 - Mean results of 3 locations

Dose	Formulation	% Control of WBPH after ...					
		1DAT	3DAT	7DAT	14DAT	21DAT	28DAT
1	AL1	32.6	46.0	60.9	64.5	57.0	49.5
	Standard EC	26.1	42.9	52.3	64.6	63.2	53.9
2	AL1	40.2	58.0	68.6	75.8	73.9	73.7
	Standard EC	30.5	48.9	64.5	65.8	64.7	63.1
3	AL1	38.0	54.3	66.1	77.4	72.8	67.0
	Standard EC	32.7	53.2	67.0	74.9	71.1	67.2
4	AL1	39.7	60.9	73.1	80.0	75.5	77.3
	Standard EC	36.0	57.6	72.8	78.6	76.4	76.3

Applications in 2001

Table 17.5 - Location: HuN-IPP

Dose	Formulation	% Secondary action on useful spiders after...					
		1DAT	3DAT	7DAT	14DAT	21DAT	28DAT
1	AL1	10.5	15.0	14.6	28.0	24.3	13.4
	Standard EC	10.9	15.2	15.2	29.8	25.4	14.7
2	AL1	12.4	16.7	16.6	29.3	25.5	15.8
	Standard EC	13.4	17.3	17.1	31.1	26.7	15.8
3	AL1	15.1	18.5	18.0	30.8	27.1	17.5
	Standard EC	14.6	19.1	18.0	31.8	27.5	17.4
4	AL1	15.2	17.7	17.2	32.3	27.9	18.9
	Standard EC	16.1	20.2	18.1	33.5	29.3	19.8

Application on 9.13.2001

Comment:

5

The activity against the two harmful organisms of the agrochemical active substance ethiprole in the AL1 formulation was, in comparison with the standard EC formulation, clearly increased on average. The secondary action on useful spiders by the use of the AL1 formulation was, in comparison with the standard EC formulation, not increased.

10

18. Density, pH value, water surface distribution and stability

Procedure:

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Use of the respective standard methods.

## Results:

Table 18 - Measured data of the formulation types AL1 to AL6

Formulation type	Density	Stability (data in brackets determined after storing at 50°C for 6 weeks)			
		pH value	Distribution on the water surface - Evaluation (§) ...		
			after 0 h	after 1 h	after 24 h
AL1	1.0006	3.6 (3.8)	3 (3)	5/6 (5/6)	
AL2	0.9912	4.0 (4.0)	1/3 (1)	3 (2)	2 (6)
AL3	1.0403	4.6 (4,2)	1 (1)	6 (6)	
AL4	1.041	4.5 (4.0)	1 (1)	5 (1/5)	6 (1)
AL5	1.042	4.4 (4.4)	1 (1)	6 (1)	6 ** (6) *
AL6	1.039	4.4 (4.4)	1 (1)	1 (1)	6 ** (6) *

Abbreviations: h = hours; (§) Test in Petri dishes, which were covered for the storage

- 5 period; in this connection, the following scoring key was used: 1. thin homogeneous film on the water surface, spectral colors visible on surface, 2. homogeneous film without spectral colors, 3. nonhomogeneous film with small swellings, 4. nonhomogeneous film with large swellings, 5. torn film, area still covered >50%, 6. torn film, area still covered <50% (\* no crystallization, \*\* slight crystallization), 7 and
- 10 8. formation of drops, 9. no distribution visible.

Comment:

The data shows that all formulation types tested have the right density. Satisfactory to excellent distribution on the water surface was ascertained, independently of the time and of the formulation type used on each occasion. Good stability under forced storage conditions (6 weeks at 50°C) was ascertained for all formulation types tested.

In addition to this data, not the slightest sign of crystal formation was ascertained with the formulation times AL1 to AL6 after storage at -10°C and the formulation types proved to be stable toward freezing.

In addition, favorable flash points of the formulation types, such as, for example, 95°C for AL1 and 96°C for AL3, may make possible simplified storage of the plant protection compositions, since expenditures on special safety measures may disappear or be reduced.

## WHAT IS CLAIMED IS:

1. The use of a plant protection composition, comprising
  - 5 a) 2-ethylhexyl lactate,
  - b) one or more agrochemical active substances dissolved therein, and
  - c) optionally one or more formulation aids,
 for the control of harmful organisms in paddy rice crops.
- 10 2. The use as claimed in claim 1, where the agrochemical active substance is selected from the group consisting of
  - 1) aclonifen, amidosulfuron, anilofos, asulam, benfuresate, byspiribac-sodium, bromoxynil, chlotoluron, cyclanilide, desmedipham, diclofop-methyl, diflufenican, diuron, ethephon, ethofumesate, ethoxysulfuron, fenoxaprop-P-ethyl, fentrazamide, flucarbazone-sodium, flufenacet, flurtamone, foramsulfuron, glufosinate-ammonium, glyphosate, iodosulfuron, ioxynil, isoproturon, isoxaflutole, linuron, mefenacet, mesosulfuron-methyl, metamitron, metosulam, metribuzin, oxadiargyl, oxadiazon, phenmedipham, propoxycarbazone-sodium, sulcotrione and thidiazuron;
  - 20 2) acetamiprid, acrinathrin, aldicarb, amitraz, azinphos-methyl, beta-cyfluthrin, carbaryl, clothianidin, cyfluthrin, cypermethrin, deltamethrin, endosulfan, ethiprole, ethoprophos, fenamiphos, fenthion, fipronil, imidacloprid, methamidophos, methiocarb, niclosamide, oxydemeton-methyl, permethrin, phosalone, prothiofos, silafluofen, spiroadiclofen, spiromesifen, thiacloprid, thiodicarb, tralomethrin, triazophos, trichlorfon and triflumuron;
  - 25 3) and bitertanol, carbendazim, carpropamid, edifenphos, fenamidone, fenhexamid, fentin, fluoxastrobin, fosetyl-aluminum, iprodione, iprovalicarb, pencycuron, propamocarb HCl, propineb, prothioconazole, pyrimethanil, spiroxamine, tolylfluanid-dichlofluanid, and trifloxystrobin.

3. The use as claimed in claim 2, where the agrochemical active substance is selected from the group consisting of

2) acetamiprid, acrinathrin, aldicarb, amitraz, azinphos-methyl, beta-cyfluthrin, carbaryl, clothianidin, cyfluthrin, cypermethrin, deltamethrin, endosulfan, ethiprole, ethoprophos, fenamiphos, fenthion, fipronil, imidacloprid, methamidophos, methiocarb, niclosamide, oxydemeton-methyl, permethrin, phosalone, prothiofos, silafluofen, spiroticlofen, spiromesifen, thiacloprid, thiodicarb, tralomethrin, triazophos, trichlorfon and triflumuron.

4. The use as claimed in claim 3, where the agrochemical active substance is selected from the group consisting of fipronil and ethiprole.

5. The use as claimed in one or more of claims 1 to 4, where the plant protection composition comprises a polydimethylsiloxane as a formulation aid c).

6. A process for controlling harmful organisms in paddy rice crops, where a plant protection composition as disclosed in any of claims 1 to 5 is applied in or on the water of paddy rice fields.

7. A plant protection composition, comprising

a) 2-ethylhexyl lactate,  
b) dissolved therein one or more agrochemical active substances from the group consisting of

1) aclonifen, amidosulfuron, anilofos, asulam, benfuresate, byspiribac-sodium, bromoxynil, chlotoluron, cyclanilide, desmedipham, diclofop-methyl, diflufenican, diuron, ethephon, ethofumesate, ethoxysulfuron, fenoxaprop-P-ethyl, fentrazamide, flucarbazone-sodium, flufenacet, flurtamone, foramsulfuron, glufosinate-ammonium, glyphosate, iodosulfuron, ioxynil, isoproturon, isoxaflutole, linuron, mefenacet, mesosulfuron-methyl, metamitron, metosulam, metribuzin, oxadiargyl, oxadiazon, phenmedipham, propoxycarbazone-sodium, sulcotrione and thidiazuron;

2) acetamiprid, acrinathrin, aldicarb, amitraz, azinphos-methyl, beta-cyfluthrin, carbaryl, clothianidin, cyfluthrin, cypermethrin, deltamethrin, endosulfan, ethiprole, ethoprophos, fenamiphos, fenthion, fipronil, imidacloprid, methamidophos, methiocarb, niclosamide, oxydemeton-methyl, permethrin, phosalone, prothiofos, silafluofen, spiroticlofen, spiromesifen, thiacloprid, thiodicarb, tralomethrin, triazophos, thrichlorfon and triflumuron;

3) and bitertanol, carbendazim, carpropamid, edifenphos, fenamidone, fenhexamid, fentin, fluoxastrobin, fosetyl-aluminum, iprodione, iprovalicarb, pencycuron, propamocarb HCl, propineb, prothioconazole, pyrimethanil, spiroxamine, tolylfluanid-dichlofluanid, and trifloxystrobin;

and

c) optionally one or more formulation aids.

8. The plant protection composition as claimed in claim 7, where the agrochemical active substance is selected from the group consisting of

2) acetamiprid, acrinathrin, aldicarb, amitraz, azinphos-methyl, beta-cyfluthrin, carbaryl, clothianidin, cyfluthrin, cypermethrin, deltamethrin, endosulfan, ethiprole, ethoprophos, fenamiphos, fenthion, fipronil, imidacloprid, methamidophos, methiocarb, niclosamide, oxydemeton-methyl, permethrin, phosalone, prothiofos, silafluofen, spiroticlofen, spiromesifen, thiacloprid, thiodicarb, tralomethrin, triazophos, thrichlorfon and triflumuron.

9. The plant protection composition as claimed in claim 8, where the agrochemical active substance is selected from the group consisting of fipronil and ethiprole.

10. The plant protection composition as claimed in one or more of claims 7 to 9, comprising a polydimethylsiloxane as a formulation aid c).

11. The plant protection composition as claimed in one or more of claims 7 to 10, comprising a solvent from the group consisting of benzylalcohol, DMSO, C<sub>12-15</sub> alkyl benzoates, diisopropyladipate, N-octylpyrrolidone and dimethylacetamide.

5 12. An active substance concentrate consisting of

a) 2-ethylhexyl lactate and

b) dissolved therein one or more agrochemical active substances from the group consisting of

- 10 1) aclonifen, amidosulfuron, anilofos, asulam, benfuresate, byspiribac-sodium, bromoxynil, chlotoluron, cyclanilide, desmedipham, diclofop-methyl, diflufenican, diuron, ethephon, ethofumesate, ethoxysulfuron, fenoxaprop-P-ethyl, fentrazamide, flucarbazone-sodium, flufenacet, flurtamone, foramsulfuron, glufosinate-ammonium, glyphosate, iodosulfuron, ioxynil, isoproturon, isoxaflutole, linuron, mefenacet,
   
15 mesosulfuron-methyl, metamitron, metosulam, metribuzin, oxadiargyl, oxadiazon, phenmedipham, propoxycarbazone-sodium, sulcotrione and thidiazuron;
- 20 2) acetamiprid, acrinathrin, aldicarb, amitraz, azinphos-methyl, beta-cyfluthrin, carbaryl, clothianidin, cyfluthrin, cypermethrin, deltamethrin, endosulfan, ethiprole, ethoprophos, fenamiphos, fenthion, fipronil, imidacloprid, methamidophos, methiocarb, niclosamide, oxydemeton-methyl, permethrin, phosalone, prothiofos, silafluofen, spirodiclofen, spiromesifen, thiacloprid, thiodicarb, tralomethrin, triazophos, thrichlorfon and triflumuron;
- 25 3) and bitertanol, carbendazim, carpropamid, edifenphos, fenamidone, fenhexamid, fentin, fluoxastrobin, fosetyl-aluminum, iprodione, iprovalicarb, pencycuron, propamocarb HCl, propineb, prothioconazole, pyrimethanil, spiroxamine, tolylfluanid-dichlofluanid, and trifloxystrobin.

30 13. A water soluble container, comprising a plant protection composition as claimed in one or more of claims 7 to 10.

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2005/000959

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A01N37/36 A01N25/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, CHEM ABS Data, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	WO 03/075657 A (MAKHTESHIM CHEMICAL WORKS LTD; SASSON, YOEL; TOLEDANO, OFER; LEVI-RUSO) 18 September 2003 (2003-09-18) cited in the application the whole document	1-13
A	WO 91/14366 A (UNION OIL COMPANY OF CALIFORNIA) 3 October 1991 (1991-10-03) cited in the application the whole document	1-13

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

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Information on patent family members

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